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Assistant Commissioner for Patents
Box PATENT APPLICATION
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): KIM, Byung Jin
SEO, Kang Soo; YOO, Jea Yong

For: METHOD FOR SUPPORTING A STILL PICTURE OF DATA STREAM
RECORDED IN A DISK RECORDING MEDIUM

Enclosed are:

- ☒ A specification consisting of 13 pages
- ☒ 04 sheet(s) of Formal drawings
- ☒ An assignment of the invention
- ☒ Certified copy of Priority Document(s)
- ☒ Executed Declaration ☐ Original ☒ Photocopy
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27
- ☐ Preliminary Amendment
- ☐ Information Disclosure Statement, PTO-1449 and reference(s)

Other _____

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Respectfully submitted,

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**METHOD FOR SUPPORTING A STILL PICTURE OF DATA STREAM
RECORDED IN A DISK RECORDING MEDIUM**

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a data recording method
for enabling a digital television to present a part of digital
data stream recorded in a disk such as a high-density digital
versatile disk (HD-DVD) as a still picture, and a method for
providing a digital television with still information based on
10 the recorded data stream.

2. Description of the Related Art

 A high-density digital versatile disk (HD-DVD), whose
recording standard is under discussion among related companies,
is a high-capacity storage device for moving pictures of large
15 size, so that it will be widely used soon. In the meantime, a
disk reproducing device (referred as 'HDVD player'
hereinafter) which is being developed to reproduce a high-
density digital versatile disk is expected to be connected with
a digital television through IEEE 1394 standard when it
20 playbacks an inserted disk.

When a HDVD player is connected with a digital television to playback a HD-DVD, it should have specific video pictures to be displayed as still images on a screen of a digital television. Examples of the specific video pictures are a background image of menu bars for selection of various functions provided from a HD-DVD, and a menu screen for editing a content scenario of a moving picture program recorded in a HD-DVD.

To embody still picture of data stream recorded in a DVD-ROM which is being popularized more and more, a still mark is written behind a data stream section corresponding to a still picture, and a DVD-ROM player, which can reproduce a DVD-ROM disk, repeats to output the last-decoded stream section if a still mark is detected while reproducing recorded programs.

This method is possible since a DVD-ROM player has been developed in expectation that it is to be connected with an analog television not equipped with a MPEG decoder so that it has a MPEG decoder as an internal component, therefore, a DVD-ROM player can detect still marks contained in data stream while decoding data stream recorded in a DVD-ROM disk.

However, a HDVD-player may not have a MPEG decoder as an internal component since it is under development on assumption that it may be connected a digital television equipped with a MPEG decoder through a digital interface such as IEEE 1394 as aforementioned.

Therefore, even though still marks are inserted in every data stream section corresponding to still picture in a HD-DVD as in a DVD-ROM, a HDVD player can not conduct still operation if it has not a decoder, that is, it can not detect the still mark.

In addition, a digital television developed at present can not support still function for data stream when it receives data stream from a HDVD player connected through a digital

interface, so that it is urgently required to develop a method of presenting a specific data stream section from a disk device such as a HDVD player in a still picture at a digital television.

SUMMARY OF THE INVENTION

5 It is an object of the present invention to provide a method of recording still information, which is identifiable at a digital television, in a high-density disk, and a method for enabling a digital television to present a part of digital stream corresponding to a still picture received through a
10 digital interface such as IEEE 1394 as a still picture based on the furnished still information or data stream.

A still picture supporting method according to the present invention, when recording video data in an optical disk, writes still information indicating that a video data stream
15 section is to be presented as a still picture, and writes information in a cell on whether there is a still picture in a stream object containing the video data stream section wherein the cell is linked with the stream object.

Another still picture supporting method according to the
20 present invention, when recording video data in an optical disk, records video data in a streaming format, and writes a transport packet indicating that a data section among the recorded video data is a still picture at a neighboring side of the data section, wherein the contents of the transport packet is not decoded when
25 reproducing the recorded video data.

Another still picture supporting method according to the present invention, when reproducing data stream recorded in an optical disk comprising recorded video data stream; still information indicating that a video data stream section among
30 the recorded video data stream is to be presented as a still picture; and information written in a cell on whether there is a still picture in a stream object containing the video data

stream section wherein the cell is linked with the stream object,
checks whether a video data reproduced from the disk is
corresponding to a still picture, and conducts an iteration of
transmitting a predictive picture data of the reproduced video
5 data repeatedly after transmitting the reproduced video data
based on the checked result.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide
a further understanding of the invention, illustrate the
10 preferred embodiments of the invention, and together with the
description, serve to explain the principles of the present
invention.

In the drawings:

FIG. 1 shows a digital television and a HDVD player to
15 which a method for supporting a still picture of data stream
recorded in a disk according to the present invention is
applied;

FIG. 2 shows a format example of a recorded stream to
embody a still picture supporting method according to the
20 present invention;

FIG. 3A shows a format example of a recorded stream to
embody another still picture supporting method according to the
present invention;

FIG. 3B shows an information example written in a cell
25 associated with a stream object containing a still picture
data; and

FIG. 4 shows a transmission example of a recorded stream
corresponding to a still picture according to another
embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order that the invention may be fully understood, preferred embodiments thereof will now be described with reference to the accompanying drawings.

5 FIG. 1 shows a digital television 200 and a HDVD player 100 to which a method for supporting a still picture of data stream recorded in a disk according to the present invention is applied. The digital television 200 and the HDVD player 100 are connected each other through a IEEE 1394 digital interface.

10 The data written in a HD-DVD which is to be played back in the HDVD player 100 is grouped into high-density stream objects (called 'HOBs' hereinafter). A HOB may correspond to a single program or a digital stream recorded from recording start to stop, and it is to be associated with each cell which
15 is used for determining the playback sequence of moving picture contents recorded in a HD-DVD.

FIG. 2 shows a format example of a recorded stream to embody a still picture supporting method according to the present invention.

20 As shown in FIG. 2, the data stream belonging to a certain HOB contains a still packet as still information. The function of a still packet is to command the digital television 200 to repeat to decode a stream constituting a single picture following the still packet instead of advancing the
25 reproduction, and a still packet contains still duration information indicating how long the requested still operation lasts. The still duration is classified into two types of the definite and the indefinite. The definite type may have time value ranging from 1 to 254 seconds, and the indefinite type
30 is used in a condition that a key command from a user is necessary.

When the data stream recorded as in FIG. 2 is reproduced in the HDVD player 100 and is transmitted to the digital

The still packet may not contain information on still duration. Instead, the HDVD player 100 resumes data reproduction from recorded data following the still packet and transmits the reproduced data stream to the digital television 5 100 if a user requests release of still status. According to the resumption of data reproduction, the digital television 200 receives data packets next to the still packet, then it acknowledges the reception of data packet as release of still picture, and decodes the received data packets as soon as it 10 stops repetition of decoding of one picture.

FIG. 3A shows another format example of a recorded stream to embody a still picture supporting method according to the present invention.

As explained above referring to FIG. 2, the data written 15 in a HD-DVD which is to be played back in the HDVD player 100 is grouped into HOBs. A HOB is also corresponding to a single program or a digital stream recorded from recording start to stop, and it is related with each cell which is used for determining the playback sequence of moving picture contents 20 recorded in a HD-DVD.

And, a HOB is composed of high-density stream object units (referred 'HOBUs' hereinafter), and a data stream constituting a HOB is recorded across a lot of data packs as shown in FIG. 3A. A data pack is a data accessing unit whose 25 size is physically readable and/or writable at a time, that is, it is corresponding to a sector of a DVD-ROM. Each data pack consists of a pack header and several transport packets written in it.

The pack header comprises fields of 'STILL Indicator', 30 'SYS_PCR_base', 'SYS_PCR_ext', and 'Reserved'. A transport packet may contain a program clock reference (PCR) which consists of a 9-bit extension value and a 33-bit base value according to the MPEG standard. The extension value is a

pictures (GOP), and real video data, and the P-picture data is composed of a header and predictive real data.

The transmission ratio of I-picture to P-picture is 1:15. That is, a I-picture is transmitted once every 15 transmission of P-picture. When transmitting the I-picture repeatedly, the HDVD player 100 generates a PCR whose value is transporting time of each transport packet constituting the I-picture, and inserts it into every packets or every a few packets. When transmitting P-pictures repeatedly, the HDVD player 100 transmits P-picture header only without transmitting predictive real data.

The information of transmitting repetition duration, i.e., still duration may be written in a cell or a pack header. If this information has been written, the HDVD player 100 resumes next reproduction after stopping the transmitting repetition when the still duration expires, if has not, it resumes next reproduction when a user requests to do that.

In this embodiment of still picture supporting method, the digital television 200 needs not conduct an additional operation for still mode, instead, it just conducts a normal operation to decode the received data stream section provided repeatedly from the HDVD player 100.

The still picture supporting method according to the present invention makes it possible to present a background image of menu bars for selection of various functions provided from a HD-DVD and a menu screen for editing a content scenario of a moving picture program recorded in a HD-DVD as a still picture on a digital television on condition that a HDVD player is delivering real data in the format of data stream to a digital television connected through a digital interface such as IEEE 1394.

The invention may be embodied in other specific forms without departing from the sprit or essential characteristics

thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed is:

1. A method of writing information for supporting still picture of data stream recorded in an optical disk, comprising the steps of:

(a) writing still information indicating that a video data stream section is to be presented in a still picture; and

(b) writing information in a cell on whether there is a still picture in a stream object containing the video data stream section, the cell being linked with the stream object.

2. The method set forth in claim 1, wherein said step (b) further writes information indicating the location of the video data stream section in the cell.

3. The method set forth in claim 1, wherein said step (a) writes the still information in a header of a sector in which the video data stream section is written.

4. The method set forth in claim 1, wherein the video data stream section to be presented as a still picture consists of Infra-coded picture data and predictive picture data.

5. A disk device comprising recorded video data stream, still information indicating that a video data stream section among the recorded video data stream is to be presented as a still picture, and information written in a cell on whether there is a still picture in a stream object containing the video data stream section wherein the cell is linked with the stream object.

6. The disk device set forth in claim 5, further comprising information indicating the location of the video

data stream section, the location information being written in the cell.

7. The disk device set forth in claim 5, wherein the still information is written in a header of a sector in which the video data stream section is written.

8. A method of writing information for supporting still picture of data stream recorded in an optical disk, comprising the steps of:

(a) recording video data in a streaming format; and

(b) writing a transport packet indicating that a data section among the recorded video data is a still picture at a neighboring side of the data section, wherein the contents of the transport packet is not decoded when reproducing the recorded video data.

9. A disk device comprising video data recorded in a streaming format, and a transport packet indicating that a data section among the recorded video data is a still picture, wherein the transport packet is written at a neighboring side of the data section and the contents of the transport packet is not decoded when reproducing the recorded video data.

10. A data reproducing method for supporting still picture of data stream recorded in an optical disk, comprising the steps of:

(a) checking whether a video data reproduced from the disk is corresponding to a still picture; and

(b) conducting an iteration of transmitting a predictive picture data of the reproduced video data repeatedly after transmitting the reproduced video data based on the checked result.

11. The method set forth in claim 10, wherein the iterative transmission ratio of the video data to the predictive picture data is 1:N wherein N is greater than 1.

12. The method set forth in claim 10, wherein said step

(b) transmits header information only without sending the predictive data when transmitting the predictive picture data repeatedly.

13. The method set forth in claim 10, wherein said step
5 (b) conducts the transmitting iteration during still time specified in still information written in the disk.

14. The method set forth in claim 10, wherein said step (b) conducts the transmitting iteration until a user requests release of still mode.

ABSTRACT OF DISCLOSURE

The present invention relates to a data recording method for enabling a digital television to present a part of digital stream recorded in a disk such as a high-density digital versatile disk (HD-DVD) as a still picture, and a method for providing a digital television with still information based on the recorded data stream. The still picture supporting method, when reproducing a high-density disk comprising recorded video data stream; still information indicating that a video data stream section among the recorded video data stream is to be presented as a still picture; and information written in a cell on whether there is a still picture in a stream object containing the video data stream section wherein the cell is linked with the stream object, checks whether a video data reproduced from the disk is corresponding to a still picture, and conducts an iteration of transmitting a predictive picture data of the reproduced video data repeatedly after transmitting the reproduced video data based on the checked result. According to the still picture supporting method, it is possible to present a background image of menu bars for selection of various functions provided from a HD-DVD and a menu screen for editing a content scenario of a moving picture program recorded in a HD-DVD as a still picture on a digital television on condition that a HDVD player is delivering real data in the format of data stream to a digital television connected through a digital interface such as IEEE 1394.

FIG. 1

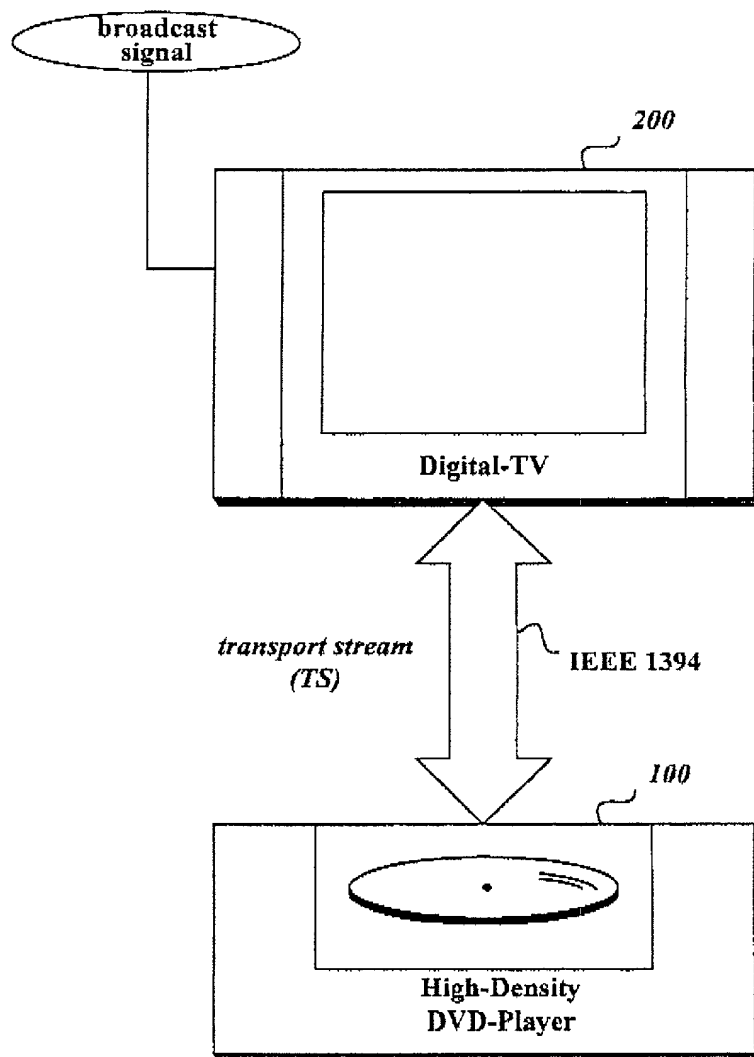
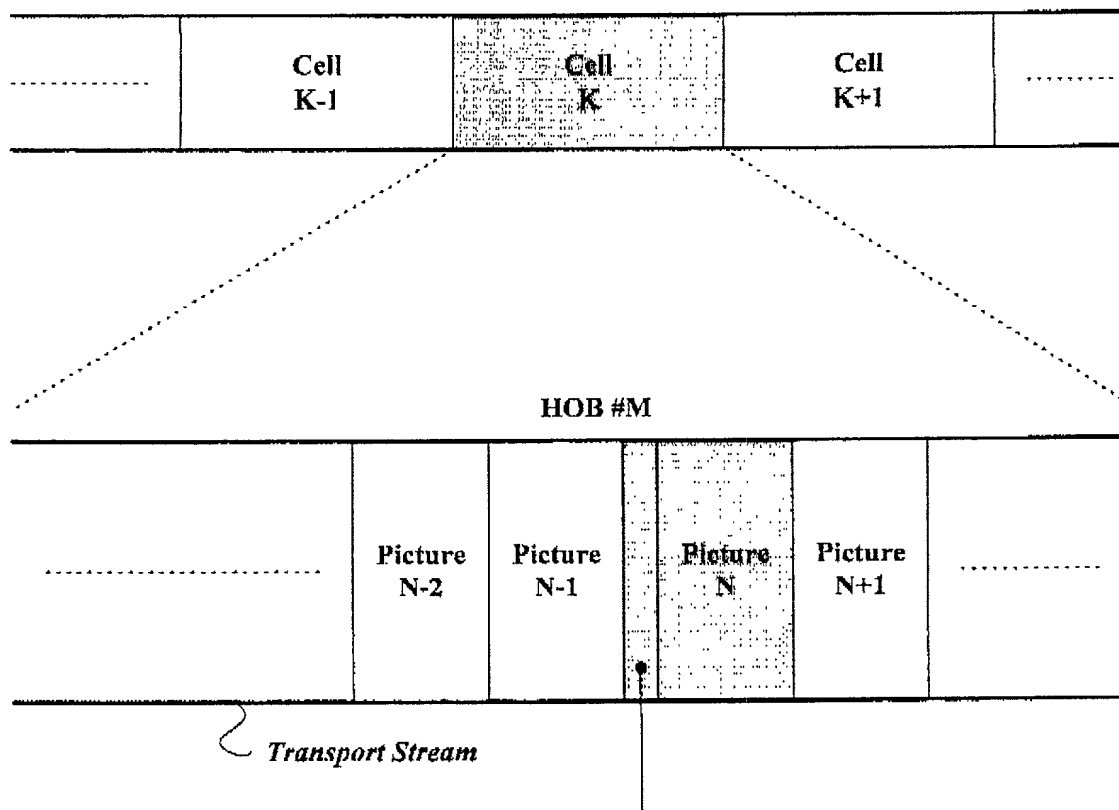


FIG. 2



a still packet which may include duration information

FIG. 3A

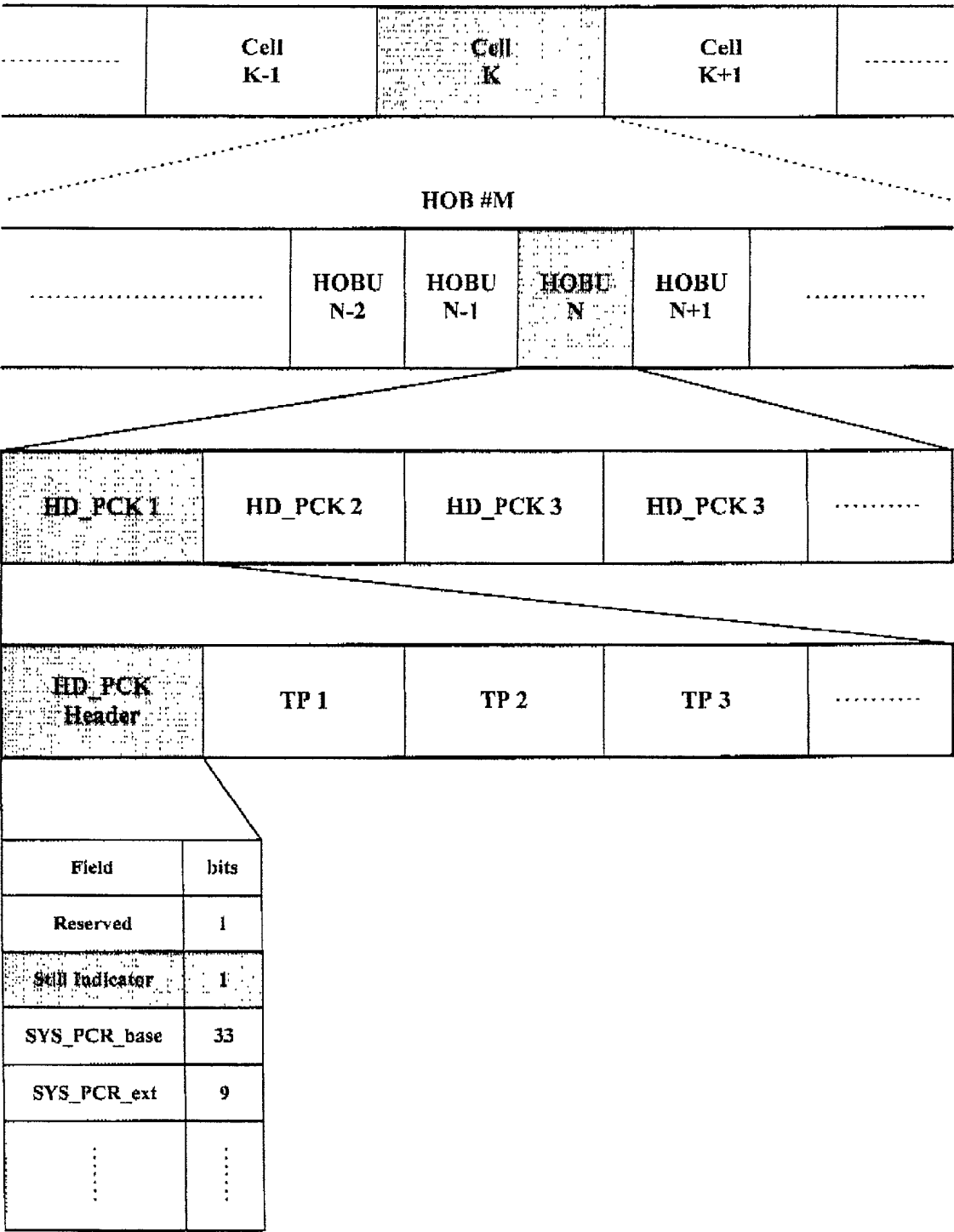


FIG. 3B

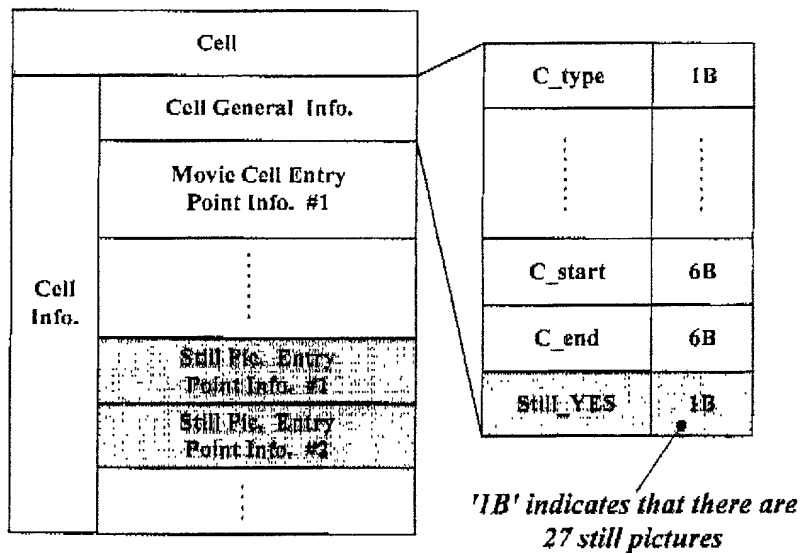
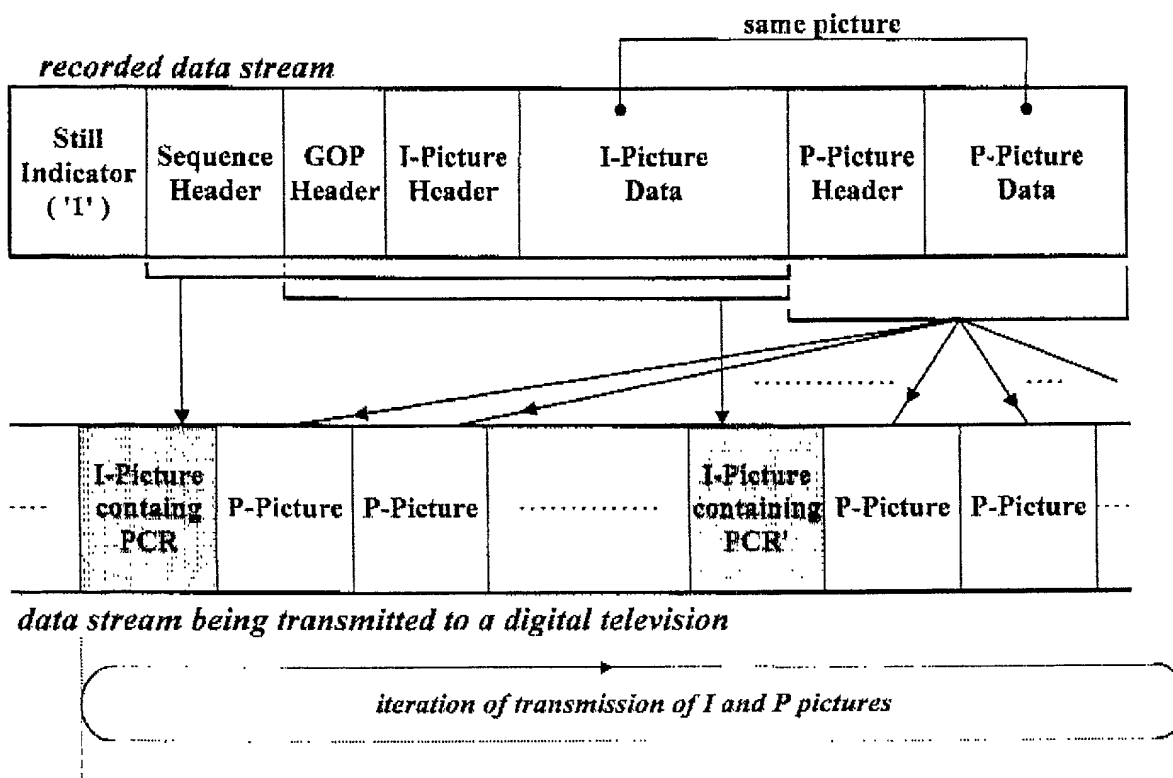


FIG. 4



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Insert Title:

METHOD FOR SUPPORTING A STILL PICTURE OF DATA STREAM RECORDED
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I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

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Prior Foreign Application(s)**Priority Claimed**

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I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

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